

Snowy Start to December ... In Hawaii!

The U.S. Climate Reference Network (USCRN) station at Mauna Loa is not a stranger to snow at its altitude of 11,179 feet, but the highlands of the Big Island of Hawaii experienced an unusually long period of snow from December 1-5, 2016. The initial storm on December 1 dropped snow levels down to 10,000 feet in places, and left a complete blanket of snow at the NOAA Mauna Loa Observatory (Figure 1). While the USCRN station is not pictured, the precipitation data



Figure 1. Picture of the snow cover on December 1, 2016 at the NOAA Mauna Loa Observatory (NOAA photo).

recorded definitively showed the impacts of snow at the observing station. In Figure 2, the blue vertical bars indicate the precipitation falling and sliding into the weighing bucket rain gauge at the USCRN station. This precipitation gauge has a heated throat that allows sticky snow to slide into the bucket as it is falling in real time. The black lines shifted to the right depict the precipitation amounts as recorded by a tipping bucket rain gauge with no heater installed. The delay indicates that it took a while for the snow to melt and drip into the gauge. While the USCRN stations are not equipped with snow depth observing instruments, the Mauna Loa Observatory personnel manually measured a total of 2.5 inches of snow that fell over the period from December 1-2; our thanks to the Mauna Loa station manager, Darryl Kuniyuki, and his staff for that information. Close to an inch of liquid water equivalent fell during the time snow was falling. A photo taken from the Volcanoes National Park on the other side of Mauna Loa showed a complete snow cover over the upper several thousand feet of the gently sloping shield volcano (Figure 3).

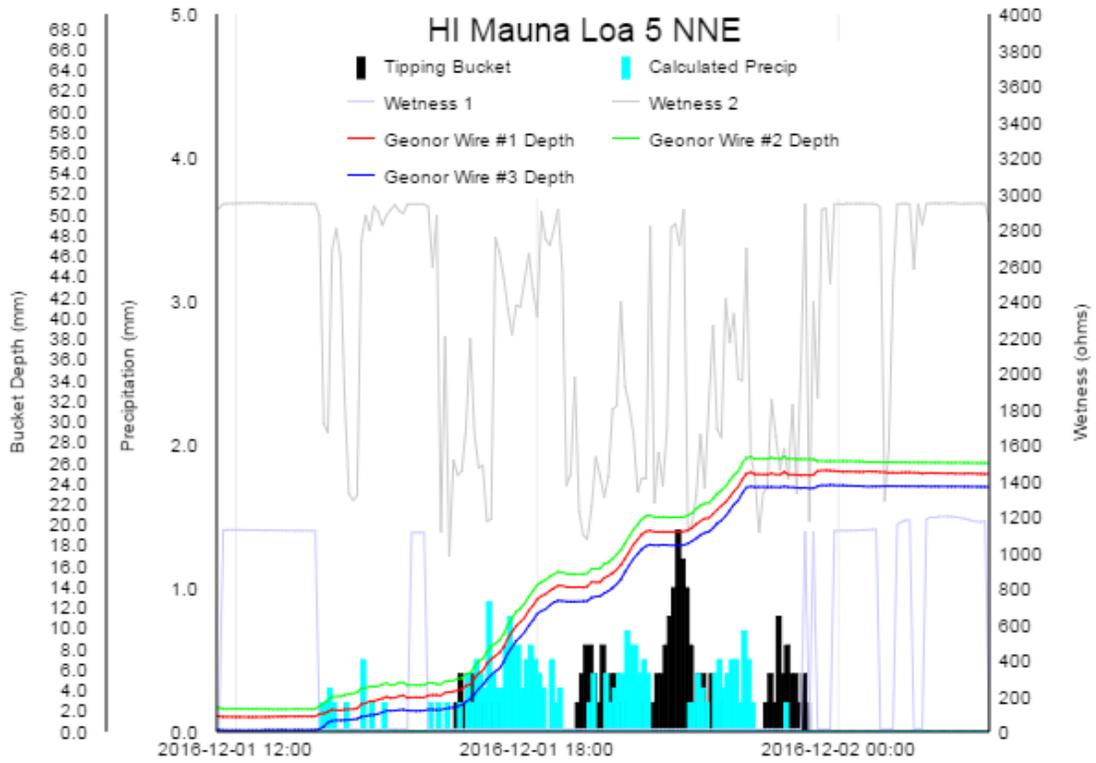


Figure 2. Precipitation record from the USCRN station on Mauna Loa, December 1, 2016. The red, green, and blue lines show the progress of precipitation during the storm, while the vertical light blue bars show the accumulated amount for each 5 minute period, and the black bars indicate the time-delayed arrival of liquid water in the tipping bucket rain gauge after the snow started to melt. A total of 0.95 inches fell on calendar day December 1 from local midnight to midnight.



Figure 3. Snow on the summit of Mauna Loa, December 2, 2016 (National Park Service photo).

The Mauna Loa Observatory is nearly 2,500 feet below the peak of the mountain, so most probably did not experience the snowiest conditions. However, the peak of neighboring Mauna Kea is occupied by an astronomical observatory at the summit at 13,803 feet, and they recorded two feet of snow. The National Park Service closed access to the summit areas of Mauna Loa for the safety of potential hikers and campers. As an aside, while skiing on Mauna Kea is done as a novelty, there are environmental and safety concerns that cause this practice to be discouraged for large groups; not as much skiing is done on Mauna Loa due to the lack of a road to the summit.

As significant as this snowfall was, the more significant impacts of these strong winter storms were found farther down the slopes where copious rains caused flash flooding in some areas. While only 4.30 inches of liquid precipitation fell at the USCRN Mauna Loa station from December 1 through December 5, mostly as cold rain after the first day, a total of 14.83 inches of rain fell at the USCRN Hilo station much closer to sea level. Several roads were closed by flooding and/or minor mudslides on the east side of the Big Island, and authorities urged residents to stay indoors and travel only if necessary.